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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/758,269	01/12/2001	Satoshi Iuchi	3914-3	9211

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EXAMINER

COLLINS, CYNTHIA E

ART UNIT	PAPER NUMBER
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1638

DATE MAILED: 05/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/758,269

Applicant(s)

IUCHI ET AL.

Examiner

Cynthia Collins

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5-14 and 17-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,5-13 and 17-19 is/are allowed.
- 6) ☒ Claim(s) 14 and 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 09/03,01/05,02/05.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

The amendment filed on February 4, 2005 has been entered.

Claims 2-4, 15-16 and 21-23 are cancelled.

Claim 11 is currently amended.

Claims 1, 5-14 and 17-20 are pending and are examined.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

All previous objections and rejections not set forth below have been withdrawn.

Information Disclosure Statement

An initialed and dated copy of Applicant's IDS form 1449, filed September 23, 2003 as part of the amendment filed under 37 C.F.R. 1.116 which amendment was entered in the office action mailed October 4, 2004, is attached to the instant Office action. Copies of Applicant's duplicate IDS forms 1449, filed January 12, 2005 and February 4, 2005 are also attached.

Claim Rejections - 35 USC § 103

Claims 14 and 20 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (U.S. Patent No. 5,981,842, issued November 9, 1999) in view of Tan et al. (Proc. Natl. Acad. Sci. USA, October 1997, Vol. 94, pages 12235-12240, Applicant's IDS, and Accession No. ZMU95953, 04 July 1997, Applicant's IDS) and Swamy et al. (Current Science, 10 May 1999, Vol. 76, No. 9, pages 1220-1228), for the reasons of record set forth in the office action mailed October 4, 2004.

Applicant's arguments filed February 4, 2005, have been fully considered but they are not persuasive.

Applicants traverse the rejection because (a) Wu et al. do not teach a relationship between endogenous ABA and LEA-induced stress tolerance in plants. Applicants maintain that Wu et al. neither teach nor suggest that the reason for the LEA-induced stress tolerance is a result of endogenous ABA synthesis. Applicants point out that the LEA expression induction as described in Wu et al. is due to exogenous ABA, and that this induction of LEA expression by exogenous ABA does not prove a direct relationship between LEA and endogenous ABA. (reply page 7)

The Examiner maintains that Wu et al. need not teach or prove a direct relationship between endogenous ABA and LEA-induced stress tolerance in plants, or the reason for the LEA-induced stress tolerance is a result of endogenous ABA synthesis, to render the claimed invention obvious. Wu et al.'s teaching that the expression of the barley group 3 LEA protein used in their method is rapidly induced in young seedlings by ABA and several stress conditions including dehydration, salt, and extreme temperature, and that there is a correlation between LEA gene expression or LEA protein accumulation with stress tolerance in a number of plants, since the timing of LEA mRNA and protein accumulation is associated with elevated in vivo abscisic acid (ABA) levels, and since the expression of LEA genes is also induced in vegetative tissues by ABA and various environmental stresses such as drought, salt, and extreme temperature, provides sufficient correlative evidence that an increase in the amount of ABA, whether provided from an internal or external source, would increase LEA mRNA and protein accumulation, and would increase tolerance of a plant to a stress. Swamy et al.'s teachings that

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increased endogenous or exogenous ABA levels result in increased plant tolerance to stresses like cold, drought, desiccation, salt and mechanical wounding also confirm that the source of ABA (internal or external) is not material.

Applicants also traverse the rejection because (b) the effect of ABA reported in Swamy et al. is also due to exogenous ABA, whereas the ABA effect in the present claims is due to endogenous ABA. Applicants maintain that nothing in the cited prior art confirms that the effect of exogenous ABA and that of endogenous ABA are identical. (reply page 7)

The Examiner maintains that the cited prior art need not confirm that the effect of exogenous ABA and that of endogenous ABA are identical to render the claimed invention obvious. The Examiner also maintains, as previously stated, that Swamy et al. teach that environmental stresses like cold, drought, desiccation, salt and mechanical wounding induce the synthesis of the plant hormone ABA (i.e. endogenous ABA), which upon synthesis plays a cardinal role in plant adaptation to stresses (abstract; page 1220 column 2 last paragraph through page 1221 column 2 first full paragraph; page 1225 paragraph spanning columns 1 and 2). The Examiner maintains that Swamy et al.'s teachings that increased endogenous or exogenous ABA levels result in increased plant tolerance to stresses like cold, drought, desiccation, salt and mechanical wounding also confirm that the source of ABA (internal or external) is not material.

Applicants additionally traverse the rejection because (c) while it is true that VP14 has neoxanthin cleavage activity, nothing in the cited prior art shows that ABA biosynthesis is enhanced by VP14, leading to enhanced stress tolerance. Applicants maintain that even though

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VP14 expression is induced by stress, it is not clear whether VP14 overexpression would lead to enhanced stress tolerance. (reply page 7)

The Examiner maintains that Tan et al., in teaching that cleavage of 9-cis-xanthophylls is the key regulatory step in the ABA biosynthetic pathway, indicates that that ABA biosynthesis would be enhanced by VP14, leading to enhanced stress tolerance.

Applicants further traverse the rejection because (d) the Examiner has not sufficiently established the motivation for "substituting the isolated DNA encoding maize VP14 protein for the isolated DNA encoding LEA protein in the method of Wu et al., as counteracting the deleterious effects of environmental stresses on plant growth and productivity, is not enough motivation to use the gene encoding VP14 of Tan et al. in place of the LEA gene of Wu et al., as the relationship between endogenous ABA and LEA gene is unknown. Applicants also point out that Wu et al. do not mention any shortcoming of their method and thus, one skilled in the art would naturally expect Wu et al's method to work and be sufficient, if not the best available method at the time, for producing a stress tolerant plant, as Wu et al's method alone would have enabled one to counteract the deleterious effects of environmental stresses on plant growth and productivity" to a certain extent, without having to resort to other methods. (reply pages 7-8)

The Examiner maintains that counteracting the deleterious effects of environmental stresses on plant growth and productivity is sufficient motivation to use the gene encoding VP14 of Tan et al. in place of the LEA gene of Wu et al., in view of the teachings of Wu et al. that overexpressing an ABA responsive LEA gene in a plant transformed therewith increases the plant's tolerance to stress, and in view of Swamy et al.'s teaching that increased ABA levels

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alone result in increased plant tolerance to stresses like cold, drought, desiccation, salt and mechanical wounding. The Examiner also maintains that Wu et al. need not teach any shortcoming of their method to render the claimed invention obvious, in view of Swamy et al.'s teaching that increased ABA levels alone result in increased plant tolerance to stresses like cold, drought, desiccation, salt and mechanical wounding, such that it would be obvious to use the gene encoding VP14 of Tan et al. in place of the LEA gene of Wu et al. to increase tolerance of a plant to a stress.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Remarks

Claims 14 and 20 are rejected.

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Claims 1, 5-13, and 17-19 are allowable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Collins whose telephone number is (571) 272-0794. The examiner can normally be reached on Monday-Friday 8:45 AM -5:15 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amy Nelson can be reached on (571) 272-0804. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Cynthia Collins
Examiner
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CC

Cynthia Collins 5/2/05